DRINKING WATER REGULATIONS

AND HEALTH ADVISORIES

by

Office of Water
U.S. Environmental Protection Agency
Washington, D.C.
202-260-7571

SAFE DRINKING WATER HOTLINE
1-800-426-4791
Monday thru Friday, 8:30 AM to 5:00 PM EST

October 1991

LEGEND

Abbreviations column descriptions are:

MCLG - Maximum Contaminant Level Goal. A non-enforceable concentration of a drinking water contaminant that is protective of adverse human health effects and allows an adequate margin of safety.

MCL - Maximum Contaminant Level. Maximum permissible level of a contaminant in water which is delivered to any user of a public water system.

RfD - Reference Dose. An estimate of a daily exposure to the human population that is likely to be without appreciable risk of deleterious effects over a lifetime.

DWEL - Drinking Water Equivalent Level. A lifetime exposure concentration protective of adverse, non-cancer health effects, that assumes all of the exposure to a contaminant is from a drinking water source.

(*) The codes for the Status Reg and Status HA columns are as follows:

F - final
D - draft
L - listed for regulation
P - proposed (Phase II and V proposals)

Other codes found in the table include the following:

NA - not applicable
PS - performance standard 0.5 NTU - 1.0 NTU
TT - treatment technique

** - No more than 5% of the samples per month may be positive. For systems collecting fewer than 40 samples/month, no more than 1 sample per month may be positive.

*** - guidance

- Large discrepancies between Lifetime and Longer-term HA values may occur because of the Agency's conservative policies, especially with regard to carcinogenicity, relative source contribution, and less than lifetime exposures in chronic toxicity testing. These factors can result in a cumulative UF (uncertainty factor) of 10 to 1000 when calculating a Lifetime HA.

Legend of Column Headings for Draft Version of
Drinking Water Standards and Health Advisories Table

Standards

NIPDWR – National Interim Primary Drinking Water Regulations: refers to the interim regulatory requirements under the Safe Drinking Water Act (SDWA) of 1974. The NIPDWR specified maximum allowable levels for 22 different contaminants at the consumer's drinking water tap. These interim standards, known as Maximum Contaminant Levels (MCL), were promulgated for 22 contaminants in March 1975, with the intention of revising and promulgating the final National Primary Drinking Water Regulations (NPDWR) a few years later. The values listed in this column are the original MCLs assigned under the interim regulations. The NPDWRs were effected under the SDWA Amendments of June 19, 1986. These revised regulations specify MCLs or treatment techniques for additional contaminants. At this time, 8 additional contaminants (synthetic volatile organic chemicals) have also been assigned MCLs. (Code of Federal Regulations, Chapter 40, part 141, et seq.)

MCLG – Maximum Contaminant Level Goal: Under the National Primary Drinking Water Regulations, the term MCLG now replaces the previous term RMCL or recommended Maximum Contaminant Level. Under the 1986 SDWA Amendments, any NPDWR which establishes an MCL must also simultaneously publish an MCLG at the time of proposed rulemaking and promulgation. The MCLG is the maximum level of a contaminant at which no known or anticipated adverse human health effects would occur, and which include an adequate margin of safety. MCLGs are nonenforceable health goals.

MCL – Maximum Contaminant Level: Derived from the MCLG, the MCL is the maximum permissible level of a contaminant in drinking water which is delivered to the consumers' tap and used by the general public for drinking. MCLs are legally enforceable. The standards reflect the best achievable levels considering the occurrence, relative source contribution factors, monitoring capability, cost of treatment, available technology and health effects. The standards listed in this column for each contaminant under the NIPDWR are either newly promulgated or revised from the NIPDWR. In a few cases, the enforceable standard has changed; however, in most cases (when comparing columns headed NIPDWR and MCL) the existing interim standard has been revised or has been newly developed.

Health Advisories

The Health Advisory (HA) program is sponsored by the Office of Drinking Water (ODW), and provides information on the health effects, analytical methods and treatment technology useful for dealing with drinking water contamination. Health advisories describe nonregulatory concentrations of drinking water contaminants at which adverse health effects would not be

anticipated to occur over specific exposure durations. Health advisories contain a margin of safety, to protect sensitive members of the population. The Health Advisories are developed for one-day, ten-day, longer term and lifetime exposures based on data describing non carcinogenic endpoints of toxicity. The advisories are intended to serve as informal technical guidance to assist Federal, State and local officials when emergency spills or contaminant situations occur. They are not construed as legally enforceable Federal standards and are subject to change as new information becomes available.

10-Kg Child, 1-Day, 10-Day and Longer Term

The child is assumed to be a more sensitive population entity. Included in this assumption, is that the body weight of a child is 10 kg and that one liter of water per day is ingested. Under these and other assumptions specific to the available toxicological data bases, Health Advisory values have been derived and listed in the respective columns for one-day, ten-day and longer term exposures. Longer term is defined as approximately 7 years, or 10 percent of an individual's lifetime.

70-Kg Adult

Health Advisory values for the adult are derived in the same way as for the 10-kg child. Again, certain assumptions are made: The adult is assumed to weigh 70 kg and consume 2 liters of water per day.

Longer Term: As with the 10-kg child, longer term exposure is approximately 7 years or 10 percent of an individual's lifetime.

RfD - Reference Dose: formerly known as the Acceptable Daily Intake (ADI), the RfD is an estimate of a daily exposure to the human population (including sensitive subpopulations) that is likely to be without appreciable risk or deleterious effects over a lifetime. The RfD is expressed in units of daily dose.

DWEL - Drinking Water Equivalent Lifetime: The medium-specific (i.e., drinking water) lifetime exposure level, assuming 100 percent exposure from that medium, at which adverse noncarcinogenic health effects would not be expected to occur. The DWEL is derived from multiplying the RfD by the adult body weight (70kg) and divided by the adult daily water consumption (2 liters/day).

Lifetime Health Advisory: This value is determined by factoring in other sources of exposure to the particular contaminant. The relative source contribution from drinking water is based on actual exposure data. If data are unavailable, a value of 20 percent is assumed for synthetic organic chemical contaminants and a value of 10 percent assumed for inorganic chemical contaminants. The lifetime Health Advisory is determined by multiplying the DWEL by the relative source contribution from drinking water.

ug/l at 10^{-4} Cancer Risk: This column contains values indicating the concentration of the particular contaminant in drinking water that would produce a 10^{-4} excess lifetime cancer risk. Simply stated, if a group of 10,000 persons was exposed to the contaminant at its respective concentration listed in this column, then one individual in the group might be expected to develop cancer (above background incidence) solely from exposure to that contaminant in drinking water.

Cancer Group: The Office of Health and Environmental Assessment (OHEA) within EPA's Office of Research and Development (ORD) has developed guidelines for carcinogen risk assessment. These guidelines discuss weighing the evidence that a substance is a carcinogen, and classifying the chemical into one of five groups, based on the weight of evidence:

Group A - Human carcinogen
Group B - Probable human carcinogen
  Group B consists of two sub-classifications:
    B_1 - limited human evidence but sufficient animal evidence
    B_2 - Sufficient animal evidence, but inadequate or no human evidence
Group C - Possible human carcinogen
Group D - Not classified as to human carcinogenicity
Group E - Evidence of noncarcinogenicity for humans

(*) The codes for the Status Reg and Status HA columns are as follows:

F - final
D - draft
L - listed for regulation
P - proposed (Phase II draft proposal, based on levels proposed in 1985)
T - tentative (Phase V)

Other codes found in the table include the following:

NA - not applicable
PS - performance standard 0.5 NTU - 1.0 NTU
TT - treatment technique
** - no more than 5% of the samples may be positive. For systems collecting fewer than 40 samples/month, no more than 1% may be positive.
*** - guidance
† - large discrepancies between Lifetime and Longer term HA values may occur because of the Agency's conservative policies, especially with regard to carcinogenicity, relative source contribution, and less than lifetime exposures in chronic toxicity testing. These factors can result in a cumulative UF (uncertainty factor) of 10 to 1,000 when calculating a Lifetime HA.

DRINKING WATER STANDARDS AND HEALTH ADVISORIES

October 1991

Chemicals	Standards			Health Advisories									
					10-kg Child			70-kg Adult					
	Status Reg.*	MCLG (mg/l)	MCL (mg/l)	Status HA*	One-day mg/l	Ten-day mg/l	Longer-term mg/l	Longer-term mg/l	RfD mg/kg/day	DWEL mg/l	Lifetime mg/l	mg/l at 10^{-4} Cancer Risk	Cancer Group
ORGANICS													
Acenaphthylene	-	-	-	-	-	-	-	-	0.06	-	-	-	-
Acifluorfen	-	-	-	F	2	2	0.1	0.4	0.013	0.4	-	0.1	B2
Acrylamide	F	zero	TT	F	1.5	0.3	0.02	0.07	0.0002	0.007	-	0.001	B2
Acrylonitrile	L	-	-	D	0.02	0.02	0.001	0.004	0.0001	0.004	-	0.007	B1
Adipates (diethylhexyl)	P	0.5	0.5	-	-	-	-	-	0.7	20	0.5	-	C
Alachlor	F	zero	0.002	F	0.1	0.1	-	-	0.01	0.4	-	0.04	B2
Aldicarb	P	0.001	0.003	F	-	-	-	-	0.0002	0.004	0.001	-	D
Aldicarb sulfone	P	0.001	0.002	F	-	-	-	-	0.002	0.004	0.001	-	D
Aldicarb sulfoxide	P	0.001	0.004	F	-	-	-	-	0.0002	0.004	0.001	-	D
Aldrin	-	-	-	D	0.0003	0.0003	0.0003	0.0003	0.00003	0.001	-	0.0002	B2
Ametryn	-	-	-	F	9	9	0.9	3	0.009	0.3	0.06	-	D
Ammonium Sulfamate	-	-	-	F	20	20	20	80	0.26	8	2	-	D
Anthracene (PAH)	-	-	-	-	-	-	-	-	0.3	-	-	-	D
Atrazine	F	0.003	0.003	F	0.1	0.1	0.05	0.2	0.005	0.2	0.003	-	C
Baygon	-	-	-	F	0.04	0.04	0.04	0.1	0.004	0.1	0.003	-	C
Bentazon	-	-	-	F	0.3	0.3	0.3	0.9	0.0025	0.09	0.02	-	D
Benz(a)anthracene (PAH)	P	zero	0.0001	-	-	-	-	-	-	-	-	-	B2
Benzene	F	zero	0.005	F	0.2	0.2	-	-	-	-	-	0.1	A
Benzo(a)pyrene (PAH)	P	zero	0.0002	-	-	-	-	-	-	-	-	-	B2*
Benzo(b)fluoranthene (PAH)	P	zero	0.0002	-	-	-	-	-	-	-	-	-	B2
Benzo(g,h,i)perylene (PAH)	-	-	-	-	-	-	-	-	-	-	-	-	D
Benzo(k)fluoranthene (PAH)	P	zero	0.0002	-	-	-	-	-	-	-	-	-	B2
bis-2-Chloroisopropyl ether	-	-	-	F	4	4	4	13	0.04	1	0.3	-	D
Bromacil	-	-	-	F	5	5	3	9	0.13	5	0.09	-	C
Bromobenzene	-	-	-	D	-	-	-	-	-	-	-	-	-

* Under review.

NOTE: Anthracene and Benzo(g,h,i)perylene -- not proposed in Phase V.

Chemicals	Standards: Status Reg.*	MCLG (mg/l)	MCL (mg/l)	Health Advisories: Status HA*	10-kg Child: One-day mg/l	10-kg Child: Ten-day mg/l	10-kg Child: Longer-term mg/l	70-kg Adult: Longer-term mg/l	70-kg Adult: RfD mg/kg/day	70-kg Adult: DWEL mg/l	70-kg Adult: Lifetime mg/l	70-kg Adult: mg/l at 10^{-4} Cancer Risk	Cancer Group
Bromochloroacetonitrile	L	-	-	D	-	-	-	-	-	-	-	-	-
Bromochloromethane	-	-	-	F	50	1	1	5	0.013	0.5	0.09	-	-
Bromodichloromethane (THM)	-	-	0.1	D	7	7	4	13	0.02	0.6	-	0.03	B2
Bromoform (THM)	L	-	0.1	D	5	2	2	6	0.02	0.6	-	0.4	B2
Bromomethane	-	-	-	F	0.1	0.1	0.1	0.5	0.001	0.05	0.01	-	D
Butyl benzyl phthalate (PAE)	P	0.1	0.1	-	-	-	-	-	0.2	6	-	-	C
Butylate	-	-	-	F	2	2	1	4	0.05	2	0.35	-	D
Butylbenzene n-	-	-	-	D	-	-	-	-	-	-	-	-	-
Butylbenzene sec-	-	-	-	D	-	-	-	-	-	-	-	-	-
Butylbenzene tert-	-	-	-	D	-	-	-	-	-	-	-	-	-
Carbaryl	-	-	-	F	1	1	1	1	0.1	4	0.7	-	D
Carbofuran	F	0.04	0.04	F	0.05	0.05	0.05	0.2	0.005	0.2	0.04	-	E
Carbon Tetrachloride	F	zero	0.005	F	4	0.2	0.07	0.3	0.0007	0.03	-	0.03	B2
Carboxin	-	-	-	F	1	1	1	4	0.1	4	0.7	-	D
Chloral Hydrate	L	-	-	D	7	1.4	0.16	0.56	0.0016	0.056	0.045	-	-
Chloramben	-	-	-	F	3	3	0.2	0.5	0.015	0.5	0.1	-	D
Chlordane	F	zero	0.002	F	0.06	0.06	-	-	0.00006	0.002	-	0.003	B2
Chlorodibromomethane (THM)	L	-	0.1	D	7	7	2	8	0.02	0.7	0.02	-	C
Chloroethane	L	-	-	D	-	-	-	-	-	-	-	-	-
Chloroform (THM)	L	-	0.1	D	4	4	0.1	0.5	0.01	0.5	-	0.6	B2
Chloromethane	L	-	-	F	9	0.4	0.4	1	0.004	0.1	0.003	-	C
Chlorophenol (2-)	L	-	-	D	0.05	0.05	0.05	0.2	0.005	0.2	0.04	-	D
p-Chlorophenyl methyl sulfide/sulfone/sulfoxide	-	-	-	D	-	-	-	-	-	-	-	-	-
Chloropicrin	L	-	-	-	-	-	-	-	-	-	-	-	-
Chlorothalonil	-	-	-	F	0.2	0.2	0.2	0.5	0.015	0.5	-	0.15	B2
Chlorotoluene o-	L	-	-	F	2	2	2	7	0.02	0.7	0.1	-	D
Chlorotoluene p-	L	-	-	F	2	2	2	7	0.02	0.7	0.1	-	D
Chlorpyrifos	-	-	-	D	0.03	0.03	0.03	0.1	0.003	0.1	0.02	-	D
Chrysene (PAH)	P	zero	0.0002	-	-	-	-	-	-	-	-	-	B2
Cyanazine	L	-	-	F	0.1	0.1	0.02	0.07	0.002*	0.07*	0.001	-	C

* Under review.

NOTE: Chrysene was proposed in second option.

Chemicals	Standards			Health Advisories									
					10-kg Child			70-kg Adult					
	Status Reg.[*]	MCLG (mg/l)	MCL (mg/l)	Status HA[*]	One-day (mg/l)	Ten-day (mg/l)	Longer-term (mg/l)	Longer-term (mg/l)	RfD (mg/kg/day)	DWEL (mg/l)	Lifetime (mg/l)	mg/l at 10^{-4} Cancer Risk	Cancer Group
Fluorene (PAH)	-	-	-	-	-	-	-	-	0.04	-	-	-	D
Fluorotrichloromethane	-	-	-	F	7	7	3	10	0.3	10	2	-	D
Fog Oil	-	-	-	D	-	-	-	-	-	-	-	-	-
Fonofos	-	-	-	F	0.02	0.02	0.02	0.07	0.002	0.07	0.01	-	D
Formaldehyde	-	-	-	D	10	5	5	20	0.15	5	1	-	B1
Gasoline, unleaded (benzene isomer)	-	-	-	D	-	-	-	-	-	-	0.005	-	-
Glyphosate	F	0.7	0.7	F	20	20	1	1	0.1	4	0.7	-	D
Heptachlor	F	zero	0.0004	F	0.01	0.01	0.005	0.005	0.0005	0.02	-	0.0008	B2
Heptachlor epoxide	F	zero	0.0002	F	0.01	-	0.0001	0.0001	1.3E-05	0.0004	-	0.0004	B2
Hexachlorobenzene	F	zero	0.001	F	0.05	0.05	0.05	0.2	0.0008	0.03	-	0.002	B2
Hexachlorobutadiene	-	-	-	F	0.3	0.3	0.1	0.4	0.002	0.07	0.001	-	C
Hexachlorocyclopentadiene	F	0.05	0.05	-	-	-	-	-	0.007	0.2	-	-	D
Hexachloroethane	-	-	-	F	5	5	0.1	0.5	0.001	0.04	0.001	-	C
Hexane (n-)	-	-	-	F	10	4	4	10	-	-	-	-	D
Hexazinone	-	-	-	F	3	3	3	9	0.033	1	0.2	-	D
HMX	-	-	-	F	5	5	5	20	0.05	2	0.4	-	D
Hypochlorite	L	-	-	-	-	-	-	-	-	-	-	-	-
Hypochlorous acid	L	-	-	-	-	-	-	-	-	-	-	-	-
Indeno(1,2,3-c,d)pyrene (PAH)	F	zero	0.0004	D	-	-	-	-	-	-	-	-	B2
Isophorone	L	-	-	D	15	15	15	15	0.2	7	0.1	-	C
Isopropyl methylphosphonate	-	-	-	D	-	-	-	-	0.1	-	-	-	D
Isopropylbenzene (cumene)	-	-	-	D	-	-	-	-	-	-	-	-	-
Lindane	F	2E-04	0.0002	F	1	1	0.03	0.1	0.0003	0.01	0.0002	-	C
Malathion	-	-	-	D	0.2	0.2	0.2	0.8	0.02	0.8	0.2	-	D
Maleic hydrazide	-	-	-	F	10	10	5	20	0.5	20	4	-	D
MCPA	-	-	-	F	0.1	0.1	0.1	0.4	0.0015	0.05	0.01	-	E
Methomyl	-	-	-	F	0.3	0.3	0.3	0.3	0.025	0.9	0.2	-	D
Methoxychlor	F	0.04	0.04	F	[illegible]	[illegible]	0.05	0.2	0.005	0.2	0.04	-	D
Methyl ethyl ketone	L	-	-	F	80	8	3	9	[illegible]	[illegible]	[illegible]	-	D
Methyl parathion	-	-	-	F	0.3	0.3	0.03	0.1	0.00025	0.009	0.002	-	D

[illegible]

[illegible]

[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

[illegible]

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

[illegible]

[illegible]